

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 6 and 7 are requested to be cancelled without prejudice or disclaimer.

Claims 12, 20 and 27 are currently being amended. Claims 30 and 31 are being added. Support for the amendment to claim 27 can be found at least in FIG. 16 and the corresponding description in the specification. Support for new claims 30 and 31 can be found at least in FIG. 10 and the corresponding description in the specification. No new matter has been added.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1-5 and 8-31 are now pending in this application, of which claims 1-5, 8-11, 16-19, 23-26, 28 and 29 are withdrawn from consideration.

Claim Rejections under 35 U.S.C. 102 and 103

Claims 6, 7 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Chang et al. ("Chang"). Claims 6 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 5,728,509 to Eda et al. ("Eda"). Claim 6 is rejected under 35 U.S.C. 102(b) as being anticipated by JP 2000-241607 to Hosada et al. ("Hosada"). Claims 6, 7, 12-15, 20-22 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eda in view of JP 02-0061123 to Iguchi ("Iguchi") and US 2003/0209819 to Brown et al. ("Brown"). The rejection with respect to claims 6 and 7 is moot in light of the cancellation of those claims. With respect to the remaining claims, applicants respectfully traverse for at least the following reasons.

Independent claims 12 and 20

Independent claim 12, with the similar feature in independent claim 20, recites “irradiating the polymer film with a light moving in any direction through the photomask, so as to form at least one pattern which is concave in a direction perpendicular to the substrate and extends in a direction parallel to the substrate, wherein the vertical cross-section of the concave pattern has at least one curved surface,” and “applying a metal film on the at least one pattern.” Eda, Iguchi and Brown, which were applied in the rejection of claims 12 and 20, fail to disclose this combination of features of claim 12.

Iguchi discloses patterning a photoresist 2 including irradiating the photoresist to form a microlens array master 6, and forming a nickel stamper 10 on the microlens array master 6, which stamps a microlens array 14.

Brown discloses a micro-lens master mold.

Eda discloses a method for manufacturing an optical device where concave patterns are formed in a photoresist 42, the photoresist is patterned (see FIG. 1c, for example), and an underlying glass substrate 40 is then patterned using the patterned photoresist as an etch mask.

The Office Action on page 7 asserts that it would have been obvious to modify the process of Eda by forming a microlens array and forming a metal stamper from this based on Iguchi and Brown. Applicants respectfully disagree. Eda is directed to forming an optical device by using a patterned photoresist as an etch mask to form an optical device on an underlying glass substrate. Eda is not concerned with forming a metal master, which is then used to form the desired optical device. Because Eda is concerned with forming its optical device directly using a patterned photoresist as an etch mask to etch an underlying optical substrate, one skilled in the art would not have modified Eda to include the extra steps of forming a metal stamper, which is then used to stamp a microlens array.

Independent claim 27

Independent claim 27, as amended, recites “irradiating the polymer film with a light moving in any direction through the photomask, and developing the polymer film after irradiating the polymer film to remove portions of the polymer film not exposed during the irradiating so as to form a plurality of polymer patterns, all or part of the vertical cross-section of which has a round surface,” and “applying and solidifying a polymer having different properties from the photosensitive polymer on the polymer patterns to surround each of the plurality of polymer patterns.” None of Eda, Brown, Eguchi or Chang disclose this combination of features of claim 27.

Eda, Brown and Eguchi are discussed above. None of these references disclose, alone or in combination, developing a photoresist after irradiating to remove portions of the resist not exposed so as to form a plurality of patterns of the resist, followed by solidifying a polymer with different properties from the resist to surround each of the plurality of patterns.

Chang discloses its method of forming a microlens array in FIG. 1 including exposing and patterning a photoresist, casting and curing PDMS in the patterned photoresist, followed by separation of the PDMS to form the microlens array.

Chang, however, likewise does not disclose developing a photoresist after irradiating to remove portions of the resist not exposed so as to form a plurality of patterns of the resist, followed by solidifying a polymer with different properties from the resist to surround each of the plurality of patterns.

Thus, none of Eda, Brown, Eguchi or Chang disclose the combination of features of claim 27 of “irradiating the polymer film with a light moving in any direction through the photomask, and developing the polymer film after irradiating the polymer film to remove portions of the polymer film not exposed during the irradiating so as to form a plurality of polymer patterns, all or part of the vertical cross-section of which has a round surface,” and “applying and solidifying a polymer having different properties from the photosensitive polymer on the polymer patterns to surround each of the plurality of polymer patterns.”

Moreover, Chang is not prior art to the present application. Chang was published on December 13, 2004, which is *after* the filing date of South Korean Application 10-2004-0009291, of February 12, 2004, to which the present application claims foreign priority. Applicants reserve the right to perfect their claim to foreign priority, by submitting a certified translation of South Korean Application 10-2004-0009291.

The dependent claims under consideration are patentable for at least the same reasons as their respective independent claims, as well as for further patentable features recited therein. For example, claim 30 recites “the step (c) of forming the at least one pattern further comprises developing the polymer film after irradiating the polymer film to remove portions of the polymer film not exposed during the irradiating such that the at one least pattern comprises a plurality of patterns,” and “the step (d) of applying a metal film applies a metal film to surround each of the plurality of patterns” which combination of features are not disclosed by the references applied in the rejection of the claims.

Double patenting

Claims 6, 7 and 27 were rejected on the grounds of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-26 of U.S. Patent No. 7,989,154 (“the ‘154 patent”).

Without agreeing with the propriety of this rejection, and in order to expedite allowance of the application, applicants submit herewith a Terminal Disclaimer with respect to the ‘154 patent, rendering this rejection moot.

Claims 6, 7, 12-15, 20-22 and 27 were provisionally rejected on the grounds of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-29, 31-37 and 39-44 of copending Application No. 12/098,180 (“the ‘180 application”). Applicants request that this rejection be held in abeyance until the application is otherwise allowable, at which time applicants will submit a terminal disclaimer, if appropriate.

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorize payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date January 31, 2012

FOLEY & LARDNER LLP
Customer Number: 22428
Telephone: (202) 945-6014
Facsimile: (202) 672-5399

By George C. Beck

George C. Beck
Attorney for Applicant
Registration No. 38,072

Thomas G. Bilodeau
Attorney for Applicant
Registration No. 43,438